

time and timing of the T wave maximal ascending slope (although ns when corrected by the heart rate).

**Conclusions:** T wave amplitude is higher, T wave slopes are steeper and initial parts of the T wave are earlier before ventricular arrhythmia compared to baseline. Detection of T wave changes prior to VT/VF might be useful in predicting imminent arrhythmia occurrence.



Example of T wave changes before VT

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### Predictive factors of difficult implantation procedure in cardiac resynchronization therapy

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No studies have been published regarding factors related to difficult CRT implantation procedure and primary left ventricular (LV) lead implant failure.

**Objectives:** The aim of this prospective study was twofold: (1) to evaluate the prevalence and predictive factors of prolonged CRT implantation procedure; (2) to identify the predictive factors of primary LV lead implantation failure.

**Methods and Results:** Between November 2008 and September 2009, 106 pts underwent primo CRT implantation. Population characteristics were a mean age of  $69 \pm 10$  years; 28.3% female; NYHA class  $3.2 \pm 0.3$ ; LVEF ( $29 \pm 6\%$ ); QRS width  $146 \pm 23$  ms. Primo CRT implantation was obtained in 96/106 pts (90.5% primary success). A second procedure was successfully attempted in 6/10 pts with a second more experienced operator (5.7%). Among the remaining 4 pts, 1 pt required an epicardial LV lead implantation, and the implantation was not reattempted in the other 3 pts. The overall success rate of CRT implantation was 96.2% (102/106 pts). Procedure parameters were as follows: LV threshold ( $1.4 \pm 0.9$ V); LV wave amplitude ( $15 \pm 8$ mV); LV impedance ( $874 \pm 215$ Ohms); median procedure time (skin to skin), 55 min. [45-80] and median of procedure fluoroscopy time, 11 min. [6.2-29]. In 24 patients (22.6%), difficult procedures requiring 85 min of implantation duration occurred. By univariate analysis, predictive factors of difficult implantation were LV ejection fraction ( $25.6 \pm 6$  vs.  $30.2 \pm 8\%$ ;  $p=0.02$ ), LVEDD ( $72.4 \pm 11$  vs.  $66 \pm 11$  mm;  $p=0.01$ ), LVESD ( $62 \pm 12$  vs.  $56 \pm 12$  mm;  $p=0.04$ ) and the operator's experience (very experienced operator vs. less experienced operator;  $p=0.006$ ). By multivariate analysis, only primary LV lead implantation failure, LVESD and operator's experience were independently associated with difficult procedures. In this patient subset with primary LV lead implant failure ( $n=10$ ), the only independent predictive factor was the LVESV ( $p=0.03$ ).

**Conclusions:** In this study, the rate of difficult CRT device implantation procedures approached 25%. Both the degree of LV dysfunction and the operator's experience were independent predictors of surgical difficulties.

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### T wave alternans in short QT Syndrome

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**Introduction:** T wave alternans (TWA) is a reliable marker of risk for malignant ventricular arrhythmias whose prognosis value has been established in many populations. Short QT syndrome (SQTS) is a recently described and very rare

channelopathy defined by a decrease in repolarisation duration and carrying a risk of ventricular fibrillation. TWA in SQTS has not been evaluated at yet.

**Methods:** 6 patients with SQTS (QT  $310 \pm 16$  ms, QTc  $329 \pm 11$  ms) underwent microvolt TWA measurement using spectral analysis. TWA testing was performed using Heartwave II (Cambridge Heart™) during bicycle exercise and classified as negative, positive or indeterminate according to the published standards for clinical interpretation.

**Results:** there were 6 men (mean age  $24 \pm 2$  yo): 4 asymptomatic, 1 with previous sudden cardiac death and 1 with unexplained syncope. 3 patients belonged from the same family. Familial history of SQTS was present in 4 (2 families) and history of unexplained sudden death was found in both families. Ventricular fibrillation was induced in 2 of 5 investigated patients. Two patients were implanted with an ICD without any appropriate therapy during follow-up. No patient was on any medical therapy. Genetic analysis was pending in each but without result at yet. TWA was negative in each patient except in one inducible asymptomatic patient (indeterminate due to too fast heart rate). Maximal negative heart rate was  $113 \pm 5$  bpm.

**Conclusions:** Conversely to what is observed in other settings, TWA testing is negative in most SQTS patients even in the symptomatic or inducible ones. This may be explained by the longer diastolic interval according to the restitution curve theory. Measurement of TWA for risk stratification in SQTS is therefore useless.

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### Outcome of patients over 75 years old receiving a pacemaker to treat sinus-node dysfunction.

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**Background:** The prognosis of patients over 75 years old receiving a pacemaker in the context of sinus-node dysfunction is unclear.

**Objective:** This study sought to evaluate the incidences of atrial fibrillation (AF), heart failure (HF) and death in this population and the role of the pacing mode in their prognosis.

**Methods:** This was a retrospective study on 102 patients over 75 years old (mean  $82.2 \pm 8.6$  years) who received a pacemaker in the context of sinus-node dysfunction.

**Results:** During the follow-up period (mean: 806 days), 36 patients (35.3%) experienced HF and 47 patients (46.1%) an episode of paroxysmal AF, 19 patients (18.6%) progressed to chronic AF, and 29 (28.4%) died, the fatal event being sudden death or of cardiac origin in almost half these patients (44.8%). Patients assigned to dual-chamber minimal ventricular pacing showed a significantly lower rate of HF episodes ( $p=0.023$ ), and a lower all-cause mortality ( $p<0.001$ ) than those assigned to conventional dual-chamber pacing. In contrast, the two groups did not differ with regard to either paroxysmal or chronic AF, regardless of whether or not the algorithms designed to prevent AF were activated.

**Conclusion:** In patients with a high risk of mortality and morbidity, the use of dual-chamber pacemakers incorporating an algorithm minimizing ventricular pacing seems to decrease the number of HF episodes and mortality. On the basis of this finding, the implantation of such devices even in this age group seems justifiable.

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### Incidental extracardiac findings on cardiac computed tomography performed before radiofrequency ablation of atrial fibrillation

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